REMARKS

The above amendments add new claims 88-108. No new matter has been added. Upon entry of this amendment, claims 32-108 are pending. A fee sheet is enclosed in duplicate.

Respectfully submitted,

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APPENDIX A
ALL PENDING CLAIMS UPON ENTRY OF THE THIS AMENDMENT

32. A field emission display device having a substrate fabricated according to a process that includes forming on said substrate inside a deposition chamber an amorphous silicon-based film having a tensile stress of between about 10^8 and about 10^9 dyne/cm^2, the method comprising:

introducing a silicon-based volatile into the deposition chamber;

introducing into the deposition chamber a conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

introducing into the deposition chamber a conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; wherein the conductivity-increasing and conductivity-decreasing volatile are introduced into said deposition chamber at a flow rate ratio between about 1:1 and about 1:1000 conductivity-increasing to conductivity-decreasing volatile; thereby forming said amorphous silicon-based film on said substrate.

33. The field emission display device of claim 32, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

34. The field emission display device of claim 32, wherein the flow rate ratio is selected to achieve a film resistivity of about 10^3-10^7 ohm-cm.

35. The field emission display device of claim 32, wherein the conductivity-increasing volatile consists of phosphine and the conductivity-decreasing volatile consists of ammonia, the phosphine and the ammonia being introduced into the deposition chamber at a flow rate ratio in a range of about 1:1000 to about 1:10 (phosphine:ammonia).

36. The field emission display device of claim 32, wherein the conductivity-increasing volatile consists of phosphine and the conductivity-decreasing volatile consists of methane,

the phosphine and the methane being introduced into the deposition chamber at a flow rate ratio in a range of about 1:100 to about 1:1 (phosphine:methane).

37. The field emission display device of claim 32, wherein the conductivity-increasing volatile includes an n-type dopant or a p-type dopant.

38. The field emission display device of claim 32, wherein the amorphous silicon-based film is characterized by a band gap, and the conductivity-decreasing volatile includes a band gap increasing component that increases the band gap of the amorphous silicon-based film relative to a film formed under similar conditions but without the band gap increasing component.

39. The field emission display device of claim 32, wherein the conductivity-decreasing volatile includes nitrogen or carbon.

40. The field emission display device of claim 32, the method further comprising introducing into the deposition chamber a second conductivity-decreasing volatile, wherein the silicon-based film consists of silane, the conductivity-increasing volatile consists of phosphine, the first conductivity-decreasing volatile consists of ammonia, and the second conductivity-decreasing volatile consists of methane.

41. The field emission display device of claim 32, wherein said substrate further includes an insulator layer and a metallic gate layer that are sequentially formed on said amorphous silicon-based film, and wherein said insulator layer and said metallic gate layer are etched in such a way as to form metallic microtips.

42. An electronic device having a substrate fabricated according to a process that includes forming on said substrate inside a deposition chamber an amorphous silicon-based film having a tensile stress of between about 10^8 and about 10^9 dyne/cm^2, the method comprising:

introducing a silicon-based volatile into the deposition chamber;

introducing into the deposition chamber a conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

introducing into the deposition chamber a conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; wherein the conductivity-increasing and conductivity-decreasing volatile are introduced into said deposition chamber at a flow rate ratio between about 1:1 and about 1:1000 conductivity-increasing to conductivity-decreasing volatile; thereby forming said amorphous silicon-based film on said substrate.

43. The electronic device of claim 42, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

44. The electronic device of claim 42, wherein the flow rate ratio is selected to achieve a film resistivity of about 10^3-10^7 ohm-cm.

45. The electronic device of claim 42, wherein the conductivity-increasing volatile consists of phosphine and the conductivity-decreasing volatile consists of ammonia, the phosphine and the ammonia being introduced into the deposition chamber at a flow rate ratio in a range of about 1:1000 to about 1:10 (phosphine:ammonia).

46. The electronic device of claim 42, wherein the conductivity-increasing volatile consists of phosphine and the conductivity-decreasing volatile consists of methane, the phosphine and the methane being introduced into the deposition chamber at a flow rate ratio in a range of about 1:100 to about 1:1 (phosphine:methane).

47. The electronic device of claim 42, wherein the conductivity-increasing volatile includes an n-type dopant or a p-type dopant.

48. The electronic device of claim 42, wherein the amorphous silicon-based film is characterized by a band gap, and the conductivity-decreasing volatile includes a band gap

increasing component that increases the band gap of the amorphous silicon-based film relative to a film formed under similar conditions but without the band gap increasing component.

49. The electronic device of claim 42, wherein the conductivity-decreasing volatile includes nitrogen or carbon.

50. The electronic device of claim 42, the method further comprising introducing into the deposition chamber a second conductivity-decreasing volatile, wherein the silicon-based film consists of silane, the conductivity-increasing volatile consists of phosphine, the first conductivity-decreasing volatile consists of ammonia, and the second conductivity-decreasing volatile consists of methane.

51. A flat panel display device having a substrate fabricated according to a process that includes forming on said substrate inside a deposition chamber an amorphous silicon-based film having a tensile stress of between about 10^8 and about 10^9 dyne/cm^2, the method comprising:

introducing a silicon-based volatile into the deposition chamber;

introducing into the deposition chamber a conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

introducing into the deposition chamber a conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; wherein the conductivity-increasing and conductivity-decreasing volatile are introduced into said deposition chamber at a flow rate ratio between about 1:1 and about 1:1000 conductivity-increasing to conductivity-decreasing volatile; thereby forming said amorphous silicon-based film on said substrate.

52. The flat panel device of claim 51, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

53. The flat panel display device of claim 51, wherein the flow rate ratio is selected to achieve a film resistivity of about 10^3-10^7 ohm-cm.

54. The flat panel display device of claim 51, wherein the conductivity-increasing volatile consists of phosphine and the conductivity-decreasing volatile consists of ammonia, the phosphine and the ammonia being introduced into the deposition chamber at a flow rate ratio in a range of about 1:1000 to about 1:10 (phosphine:ammonia).

55. The electronic device of claim 51, wherein the conductivity-increasing volatile consists of phosphine and the conductivity-decreasing volatile consists of methane, the phosphine and the methane being introduced into the deposition chamber at a flow rate ratio in a range of about 1:100 to about 1:1 (phosphine:methane).

56. The flat panel display device of claim 51, wherein the conductivity-increasing volatile includes an n-type dopant or a p-type dopant.

57. The flat panel display device of claim 51, wherein the amorphous silicon-based film is characterized by a band gap, and the conductivity-decreasing volatile includes a band gap increasing component that increases the band gap of the amorphous silicon-based film relative to a film formed under similar conditions but without the band gap increasing component.

58. The flat panel display device of claim 51, wherein the conductivity-decreasing volatile includes nitrogen or carbon.

59. The flat panel display device of claim 51, the method further comprising introducing into the deposition chamber a second conductivity-decreasing volatile, wherein the silicon-based film consists of silane, the conductivity-increasing volatile consists of phosphine, the first conductivity-decreasing volatile consists of ammonia, and the second conductivity-decreasing volatile consists of methane.

60. A field emission display device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate in a deposition chamber by a method comprising:

introducing into a deposition chamber a silicon-based volatile;

introducing into the deposition chamber a conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

introducing into the deposition chamber a conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film thereby forming said amorphous silicon-based film on said substrate.

61. The field emission display device of claim 60, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

62. The field emission display device of claim 60, wherein said substrate further includes an insulator layer and a metallic gate layer that are sequentially formed on said amorphous silicon-based film, and wherein said insulator layer and said metallic gate layer are etched in such a way as to form metallic microtips.

63. An electronic device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate inside a deposition chamber using a method comprising:

introducing into a deposition chamber a silicon-based volatile;

introducing into the deposition chamber a conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

introducing into the deposition chamber a conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film thereby forming said amorphous silicon-based film on said substrate.

64. The electronic device of claim 63, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

65. A flat panel display device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate inside a deposition chamber using a method comprising:

introducing into a deposition chamber a silicon-based volatile;

introducing into the deposition chamber a conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

introducing into the deposition chamber a conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film thereby forming said amorphous silicon-based film on said substrate.

66. The flat panel device of claim 65, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

67. A field emission display device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate in a deposition chamber by a method comprising:

maintaining a silicon-based volatile at a first partial pressure in said deposition chamber;

maintaining a conductivity-increasing volatile at a second partial pressure in said deposition chamber, the conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

maintaining a conductivity-decreasing volatile at a third partial pressure in said deposition chamber, the conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; and

regulating said first, second and third partial pressures to form said amorphous silicon-based film on said substrate such that said amorphous silicon-based film has a stress level of about 10^8 dyne/cm^2 to about 10^9 dyne/cm^2.

68. The field emission device of claim 67, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

69. The field emission display device of claim 67, wherein said substrate further includes an insulator layer and a metallic gate layer that are sequentially formed on said amorphous silicon-based film, and wherein said insulator layer and said metallic gate layer are etched in such a way as to form metallic microtips.

70. An electronic device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate inside a deposition chamber using a method comprising:

maintaining a silicon-based volatile at a first partial pressure in said deposition chamber;

maintaining a conductivity-increasing volatile at a second partial pressure in said deposition chamber, the conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

maintaining a conductivity-decreasing volatile at a third partial pressure in said deposition chamber, the conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; and

regulating said first, second and third partial pressures to form said amorphous silicon-based film on said substrate such that said amorphous silicon-based film has a stress level of about 10^8 dyne/cm^2 to about 10^9 dyne/cm^2.

71. The electronic device of claim 70, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

72. A flat panel display device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate inside a deposition chamber using a method comprising:

maintaining a silicon-based volatile at a first partial pressure in said deposition chamber;

maintaining a conductivity-increasing volatile at a second partial pressure in said deposition chamber, the conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

maintaining a conductivity-decreasing volatile at a third partial pressure in said deposition chamber, the conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; and

regulating said first, second and third partial pressures to form said amorphous silicon-based film on said substrate such that said amorphous silicon-based film has a stress level of about 10^8 dyne/cm^2 to about 10^9 dyne/cm^2.

73. The flat panel display device of claim 72, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

74. A field emission display device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate in a deposition chamber by a method comprising:

maintaining a silicon-based volatile at a first partial pressure in said deposition chamber;

maintaining a conductivity-increasing volatile at a second partial pressure in said deposition chamber, the conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

maintaining a conductivity-decreasing volatile at a third partial pressure in said deposition chamber, the conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; and

regulating said first, second and third partial pressures to form said amorphous silicon-based film on said substrate such that said amorphous silicon-based film has a resistivity of about 10^3 ohm-cm to about 10^7 ohm-cm.

75. The field emission display device of claim 74, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

76. The field emission display device of claim 74, wherein said substrate further includes an insulator layer and a metallic gate layer that are sequentially formed on said amorphous silicon-based film, and wherein said insulator layer and said metallic gate layer are etched in such a way as to form metallic microtips.

77. An electronic device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate inside a deposition chamber using a method comprising:

maintaining a silicon-based volatile at a first partial pressure in said deposition chamber;

maintaining a conductivity-increasing volatile at a second partial pressure in said deposition chamber, the conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

maintaining a conductivity-decreasing volatile at a third partial pressure in said deposition chamber, the conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; and

regulating said first, second and third partial pressures to form said amorphous silicon-based film on said substrate such that said amorphous silicon-based film has a resistivity of about 10^3 ohm-cm to about 10^7 ohm-cm.

78. The electronic device of claim 77, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

79. A flat panel display device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate inside a deposition chamber using a method comprising:

maintaining a silicon-based volatile at a first partial pressure in said deposition chamber;

maintaining a conductivity-increasing volatile at a second partial pressure in said deposition chamber, the conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

maintaining a conductivity-decreasing volatile at a third partial pressure in said deposition chamber, the conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; and

regulating said first, second and third partial pressures to form said amorphous silicon-based film on said substrate such that said amorphous silicon-based film has a resistivity of about 10^3 ohm-cm to about 10^7 ohm-cm.

80. The flat panel display device of claim 79, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

81. A field emission display device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate in a plasma-enhanced deposition chamber by a method comprising:

introducing into the plasma-enhanced deposition chamber a silicon-based volatile;

introducing into the plasma-enhanced deposition chamber a conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

introducing into the plasma-enhanced deposition chamber a conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; wherein:

said plasma-enhanced chemical vapor deposition process is limited to a plasma power of about 0.18 watts/cm^2 to about 0.36 watts/cm^2.

82. The field emission display device of claim 81, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

83. The field emission display device of claim 81, wherein said substrate further includes an insulator layer and a metallic gate layer that are sequentially formed on said amorphous silicon-based film, and wherein said insulator layer and said metallic gate layer are etched in such a way as to form metallic microtips.

84. An electronic device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate inside a plasma-enhanced deposition chamber using a method comprising:

introducing into the plasma-enhanced deposition chamber a silicon-based volatile;

introducing into the plasma-enhanced deposition chamber a conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

introducing into the plasma-enhanced deposition chamber a conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; wherein:

said plasma-enhanced chemical vapor deposition process is limited to a plasma power of about 0.18 watts/cm^2 to about 0.36 watts/cm^2.

85. The electronic device of claim 84, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

86. A flat panel display device having a substrate fabricated according to a process that includes forming an amorphous silicon-based film on said substrate inside a plasma-enhanced deposition chamber using a method comprising:

introducing into the plasma-enhanced deposition chamber a silicon-based volatile;

introducing into the plasma-enhanced deposition chamber a conductivity-increasing volatile including one or more components for increasing the conductivity of the amorphous silicon-based film; and

introducing into the plasma-enhanced deposition chamber a conductivity-decreasing volatile including one or more components for decreasing the conductivity of the amorphous silicon-based film; wherein:

said plasma-enhanced chemical vapor deposition process is limited to a plasma power of about 0.18 watts/cm^2 to about 0.36 watts/cm^2.

87. The flat panel display device of claim 86, wherein said deposition chamber is a CVD chamber or a PECVD chamber.

88. (New) A field emission display device having an amorphous silicon-based film having a resistivity between about 10^3 ohm-cm and about 10^7 ohm-cm, wherein said amorphous silicon-based film includes a conductivity-increasing dopant and a conductivity-decreasing dopant.

89. (New) The field emission display device of claim 88, wherein said conductivity-increasing dopant is an n-type dopant or a p-type dopant.

90. (New) The field emission device of claim 88, wherein said conductivity-increasing dopant comprises boron or phosphorous.

91. (New) The field emission device of claim 88, wherein said conductivity-decreasing dopant comprises nitrogen or carbon.

92. (New) The field emission device of claim 88, wherein said amorphous silicon-based film is deposited on a substrate.

93. (New) The field emission device of claim 88, wherein said amorphous silicon-based film has a tensile stress of between about 10^8 and about 10^9 dyne/cm^2.

94. (New) The field emission device of claim 88, wherein said amorphous silicon-based film has a resistivity between about 10^5 ohm-cm and about 10^6 ohm-cm.

95. (New) An electronic device having an amorphous silicon-based film having a resistivity between about 10^3 ohm-cm and about 10^7 ohm-cm, wherein said amorphous silicon-based film includes a conductivity-increasing dopant and a conductivity-decreasing dopant.

96. (New) The electronic device of claim 95, wherein said conductivity-increasing dopant is an n-type dopant or a p-type dopant.

97. (New) The electronic device of claim 95, wherein said conductivity-increasing dopant comprises boron or phosphorous.

98. (New) The electronic device of claim 95, wherein said conductivity-decreasing dopant comprises nitrogen or carbon.

99. (New) The electronic device of claim 95, wherein said amorphous silicon-based film is deposited on a substrate.

100. (New) The electronic device of claim 95, wherein said amorphous silicon-based film has a tensile stress of between about 10^8 and about 10^9 dyne/cm^2.

101. (New) The electronic device of claim 95, wherein said amorphous silicon-based film has a resistivity between about 10^5 ohm-cm and about 10^6 ohm-cm.

102. (New) A flat panel display device having an amorphous silicon-based film having a resistivity between about 10^3 ohm-cm and about 10^7 ohm-cm, wherein said amorphous silicon-based film includes a conductivity-increasing dopant and a conductivity-decreasing dopant.

103. (New) The flat panel display device of claim 102, wherein said conductivity-increasing dopant is an n-type dopant or a p-type dopant.

104. (New) The flat panel display device of claim 102, wherein said conductivity-increasing dopant comprises boron or phosphorous.

105. (New) The flat panel display device of claim 102, wherein said conductivity-decreasing dopant comprises nitrogen or carbon.

106. (New) The flat panel display device of claim 102, wherein said amorphous silicon-based film is deposited on a substrate.

107. (New) The electronic device of claim 102, wherein said amorphous silicon-based film has a tensile stress of between about 10^8 and about 10^9 dyne/cm^2.

108. (New) The electronic device of claim 102, wherein said amorphous silicon-based film has a resistivity between about 10^5 ohm-cm and about 10^6 ohm-cm.